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Goddard Space Flight Center
Greenbelt, Maryland

From: Colorado School of Mines
Department of Geology

Subject: Type I report for the period 1 June to 31 July 1973
(NASA Contract NAS5-21778)

Title: Geologic and Mineral and Water Resources Investigations
in Western Colorado (Proposal 026)

(GSFC Principal Investigator Identification No. UN 209)

INTRODUCTION

The primary objective of the Colorado School of Mines ERTS-1 Program is to analyze ERTS-1 data for identification and discrimination of geological and hydrological phenomena in central and western Colorado. To facilitate the achievement of this objective, the research has been subdivided into the following tasks:

Task I. Analyze ERTS-1 data for identification and discrimination of:

- A. lithology and surface composition
- B. geologic structure
- C. geomorphic phenomena
- D. mineral resources
- E. water resources
- F. volcanic phenomena

Task II. Determine the atmospheric affects on remote sensor data.

Task III. Investigate and evaluate:

- A. the RBV and MSS data for task I, A through F
- B. processing and enhancement techniques as applied to ERTS-1 data

Task IV. Educate graduate students and give experience to research personnel in the use of satellite remote sensor data.

Task V. Submission of a final report (Type III) which will discuss in depth the history of the overall project and all significant scientific and technical theories, procedures, techniques, equipment, tests and project results.

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(E73-10837) GEOLOGIC AND MINERAL AND
WATER RESOURCES INVESTIGATIONS IN WESTERN
COLORADO Progress Report, 1 Jun. - 31
Jul. 1973 (Colorado School of Mines)
3 p HC \$3.00

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CURRENT INVESTIGATION

The principle activity during the past two months has been detailed and reconnaissance field studies based on preliminary photo-interpretations of ERTS satellite imagery and aircraft support data made during the past winter and spring. These studies are designed to provide information on:

- 1) the nature and scale of features identified on ERTS images
- 2) the nature and scale of features present, but not identified on ERTS images
- 3) the possible economic significance of geologic features mapped on ERTS images

It is anticipated that detailed geologic information from selected areas will allow geologic mapping to be extended into the surrounding terrain by use of the various ERTS data, and will provide the necessary information for determining the geological significance of features detectable on ERTS images.

Spectral reflectance measurements of selected rocks outcrops and solar radiation measurements were made during the 17 May and 21 June ERTS overpasses. These data will be used in determining the effects of the atmosphere on remote sensing data. Research has continued into the use of color additive viewing and video image processing (density slicing) as interpretative tools in geologic analysis of ERTS imagery, and equipment was assembled to allow electronic analog processing of MSS tapes. Lineament data derived from photo-interpretation of ERTS images are being statistically analyzed to determine the geologic significance of the probable fracture information which can be derived from ERTS imagery.

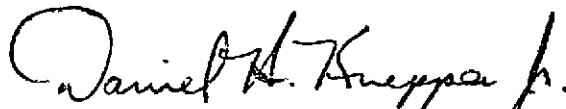
PROJECT STATUS

Progress of ERTS-1 satellite and support data analysis, interpretation, and evaluation is proceeding along a productive course and should be completed on schedule. Current funding appears to be adequate for meeting the stated objectives of the CSM/ERTS-1 project.

NEXT REPORTING PERIOD

During the next reporting period ERTS-1 satellite and support data will be further analyzed, interpreted, and evaluated. Color additive viewing of the recent spring and summer, snow-free ERTS imagery will be studied to determine seasonal influence on geologic interpretation of ERTS data. Video image processing of ERTS imagery and electronic analog processing of ERTS tapes will be evaluated for potential applications in geologic analysis.

The primary activity during the next reporting period, however, will be the analysis and evaluation of field data acquired during June and July and the comparison of the field data with geologic interpretations of ERTS imagery. The thrust of these studies will be 1) to define the type and scale of geologic phenomena that can be mapped on ERTS images of western Colorado and 2) to determine the physical terraine characteristics which define these features.

A handwritten signature in dark ink, reading "Daniel H. Knepper, Jr." with a stylized flourish at the end.

Daniel H. Knepper, Jr.

Principal Investigator